Developing Quality White Tea (Artisan Tea) Manufacturing Protocol by Using Different Clone with their Different Combinations in Respect of Bangladesh

Md. ISMAIL HOSSAIN
Md. RIYADH AREFIN

Abstract:

The present study was conducted to develop quality-full white tea manufacturing protocol by using of different clone with their different combinations in respect of Bangladesh. Three BTRI released clones BT2 (=V_1), BT4 (=V_2) and BT19 (=V_3) along with different combination under six treatments having each of three replications were used in this experiment: T_1= only BT2, T_2= BT2 50% & BT4 50%, T_3= BT2 80% & BT4 20%, T_4= only BT19, T_5=BT19 50% & BT4 50% and T_6= BT19 80% & BT4 20%. In the experiment, most interesting thing was that, white tea of T_1 treatment had best flavour which was the result of using only V_1 clone but had less Strength and less astringency. Whereas on the basis of overall quality category, T_3 treatment (35.62a) gave the best (Excellent Quality Category) white tea followed by T_1 treatment (33.89b), T_6 treatment (33.75b) and T_4 (33.41) gave Above Average Quality Category white tea. But T_2 (31.65c) and T_5 (31.45c) produced Average Quality Category white tea.

Key words: White Tea, Flavour, Dry leaf appearance, Liquor, Astringency etc.

INTRODUCTION:

Tea, the infusion from *Camellia sinensis* (L), is one of the world's most widely consumed beverages (Cabrera et al., 2006

and Sharangi et al., 2009). Tea is the extract of leaves, leaf nodes and internodes of plant (*Camellia sinensis*) which is consumed as extract in hot water rather than being eaten as such. It is also referred to as an aromatic liquid product which has been made by curing the leaves by applying water in hot form (Xiao et al., 2008). The main consumed tea types are black and green tea but recently white tea has become more available to consumers in the West and some Asian countries (Hilal & Engel-hardt, 2007). China produces almost 3% white tea of its total tea production. Darjeeling produces somewhat low in percentage but significant amount of white tea was produced by Srilanka.

Teas vary in properties depending on geographical origin, climatic conditions and processing methods (Cabrera et al., 2006), but in general, they can be classified into three types: non-oxidized (green and white teas), partially oxidized (oolong tea) and completely oxidized (black tea) (Moderno et al., 2009 and Hilal et al., 2007). Artisanal tea or artisan tea are generally hand-made in small batches by artisans with much skill and years of knowledge. White tea can be named as one kind of "artisan tea" because it requires a lot of labour along with a lot of real experience for years. White tea is non-oxidized tea produced from young shoots of *Camellia sinensis* (Alcazar et al., 2007). It is non-fermented tea and usually protected from sunlight to avoid polyphenol degradation. It is exclusively prepared from very young tea leaves and/or only buds, which are harvested before being fully open and are processed by air drying (Venditti et al., 2010). This less extended processing confers to white tea its special and highly appreciated odour and flavour characteristics (Müller et al., 2010 and Rusak et al., 2008).

The manufacturing procedure of white tea in Bangladesh Tea Research Institute is already standardized. So the current study was conducted to develop quality-full white

tea manufacturing protocol by using of different clone with their different combinations in respect of Bangladesh.

MATERIAL AND METHODS

The experiment was carried out at BTRI Miniature Factory from March 2017 to December 2017 to study the white tea quality under the following six different types of treatments. Three BTRI released clones BT2 ($=V_1$), BT4 ($=V_2$) and BT19 ($=V_3$) along with different combination under six treatments having each of three replications were used in this experiment:

T_1 **treatment:** In this treatment, the unopened bud was collected only from V_1.

T_2 **treatment:** In this treatment, 50% the unopened bud was collected only from V_1 and 50% the unopened bud was collected only from V_2.

T_3 **treatment:** In this treatment, 80% the unopened bud was collected only from V_1 and 20% the unopened bud was collected only from V_2.

T_4 **treatment:** In this treatment, the unopened bud was collected only from V_3.

T_5 **treatment:** In this treatment, 50% the unopened bud was collected only from V_3 and 50% the unopened bud was collected only from V_2.

T_6 **treatment:** In this treatment, 80% the unopened bud was collected only from V_3 and 20% the unopened bud was collected only from V_2.

Here, BT2 has a consistent touch of flavour (Darjeeling Flavour) while BT4 is a quality clone (having excellent cup quality) and BT19 has sweet flavour. BT2 and BT19 are more suitable for making white tea than BT4 because of having flavour (Tea and human health, 2018).

All the treatments were used in the same processing method under withering for 1-2 days, then hand rolling for 20 minutes and immediate repeated drying at 180-200^{0}F for 30 minutes for bringing down the moisture at 3%. For obtaining good quality of white tea, the only unopened bud was plucked and processed. Unopened hairy buds are commonly desired for best quality of white tea.

Quality of all the white tea of all treatments were assessed by conventional organoleptic test and scored numerically on the basis of liquoring characters. Dry leaf appearance and liquoring characteristics were also assessed during quality test, as bellow:

1. White Dry leaf appearance (10 Points)
2. Liquoring characteristics (40 points):
2.1. Colourless Liquor (10 points)
2.2. Flavour (10 points)
2.3. Strength (10 points)
2.4. Astringency (10 points)
Total= 50 Points.

Quality scores were recorded and analyzed statistically using MSTAT programme in a microcomputer. For categorize white tea, we developed a "Quality Category" on the basis of dry leaf appearance and liquoring characteristics scoring (out of 50 points) which is as below:

Table-1. Quality category of white tea

Quality category	Score
E = Excellent	34 to >34 out of 50
AA = Above Average	32 to <34 out of 50
A = Average	30 to <32 out of 50
BA = Below Average	<32 out of 50

RESULTS AND DISCUSSION

The quality of white tea of different treatments was assessed by conventional organoleptic test. For quality white, flavour is

the most important character. From the Table-1, in case of flavour parameter, the highest flavour was given by T_1 (7.27a) & T_3 (7.21a) were statistically similar and gave a unique and malty flavour which was followed by T_6 (7.11ab) & T_4 (7.02b). The lowest flavour was produced by T_2 (5.98c) and T_5 (5.84c) treatments.

On the other hand, for white dry leaf appearance parameter, the highest quality was given by T_3 (7.18a) which was followed by T_4 (7.08ab), T_1 (7.04b) & T_6 (7.02b). The lowest flavour was produced by T_5 (6.16c) & T_2 (6.12c) treatment.

For colorless liquor parameter, T_1 (7.15a) & T_6 (7.15a) treatments gave the highest quality which are statistically similar and followed by T_3 (7.10ab), & T_4 (7.11ab) treatments which were also statistically similar. The lowest result was given by T_2 (6.96b) and T_5 (6.86b) treatments.

In case of strength parameter, T_3 (7.11a) treatment produced best strength while rest of the treatments (T_5, T_1, T_6 and T_2) gave the second highest quality which are statistically similar.

On the other hand, T_3 (7.11a) gave highest astringency which was followed by T_2 (6.37ab), T_6 (6.22b) and T_1 (6.17b) which were statistically similar. The lowest astringency was given by T_4 (6.06bc) and T_5 (5.87c) treatments.

Table-2. Liquoring characteristics with scoring of white tea of different treatments.

Treatments	White Dry leaf appearance (10 points)	Colourless Liquor (10 Points)	Flavour (10 points)	Strength (10 points)	Astringency (10 points)	Total points (50 Points)	Quality category
T_1	White (7.04b)	7.15 a	7.27a	6.26b	6.17b	33.89b	AA
T_2	Whitish (6.12c)	6.96b	5.98c	6.22b	6.37ab	31.65c	A
T_3	White (7.18a)	7.10ab	7.21a	7.02a	7.11a	35.62a	E
T_4	White (7.08ab)	7.11ab	7.02b	6.14b	6.06bc	33.41b	AA
T_5	Whitish (6.16c)	6.86b	5.84c	6.72ab	5.87c	31.45c	A
T_6	White (7.02b)	7.15a	7.11ab	6.25b	6.22b	33.75b	AA

E = Excellent, AA = Above Average, A = Average and BA = Below Average

Within column values followed by different letter (s) are significantly different by DMRT ($p \leq 0.05$)

From the results of five parameters and total points of Table-02, it revealed that T_3 treatment (35.62a) gave the best (Excellent Quality Category) white tea followed by T_1 treatment (33.89b), T_6 treatment (33.75b) and T_4 (33.41) gave Above Average Quality Category white tea. But T_2 (31.65c) and T_5 (31.45c) produced Average Quality Category white tea.

CONCLUSIONS

In the experiment, most interesting thing was that, T_1 treatment white tea had best flavour which was the result of using only V_1 clone but less Strength and less astringency. Whereas, T_3 (blending of 80% V_1 and 20% V_2) produced the best quality of white tea in respect of overall parameters. Quality white tea can also be produced by T_1 treatment (only V_1), T_6 treatment (blending of 80% V_3 and 20% V_2) and T_4 (only V_3) which gave Above Average Quality Category white tea.

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